

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions of claims in the application.

Listing of Claims

1 - 14. (canceled)

15. (currently amended) A process for producing a semiconductor device which comprises forming an element-separating oxide film on a silicon substrate by thermal oxidation, and thereafter carrying out a heat-treatment at a temperature of not lower than 800 °C while keeping a surface of the oxide film in an inert atmosphere, followed by formation of a gate oxide film, introduction of impurities, formation of electrodes and wiring, and formation of an insulating film so as to form a transistor,

wherein the heat-treatment of the oxide film is carried out after removal of an oxidation-preventing film so as to make the oxide film in an element-forming area in a bare state, and the thermal oxidation is carried out at least in an atmosphere of a gaseous mixture of hydrogen and oxygen or in an atmosphere of H₂O.

16. (previously submitted) A process according to claim 15, wherein the heat-treatment is carried out in an atmosphere of an inert gas selected from nitrogen, hydrogen and argon, or a gaseous mixture of these gases, said gas or gaseous mixture being able to contain 5% or less of oxygen.

17. (previously submitted) A process according to claim 15, wherein the oxide film is kept in a bare state during the heat-treatment for stress relaxation.

18. (currently amended) A process for producing a semiconductor device, which comprises the steps of:

oxidizing a main surface of a silicon substrate,

forming an oxidation-preventing film on portions of the oxidized silicon substrate,

removing a part of the oxidation-preventing film that is located in an element-separating area,

forming an element-separating oxide film on the silicon substrate in the element-separating area after removing the part of the oxidation-preventing film,

forming a thermal oxide film on the silicon substrate by oxidizing the silicon substrate, and

after forming the thermal oxide film in an element-forming area, carrying out a heat-treatment at a temperature of 800° C or higher in an inert atmosphere, and

which further comprises forming a gate oxide film over the heat-treated silicon substrate.

19. (previously submitted) A process according to claim 18, wherein the heat-treatment is carried out in an atmosphere of an inert gas selected from nitrogen, hydrogen and argon, or a gaseous mixture of these gases, said gas or gaseous mixture being able to contain 5% or less of oxygen.

20. (previously submitted) A process according to claim 18, wherein the oxide film is kept in a bare state during the heat-treatment for stress relaxation.

21. (previously submitted) A process according to claim 18, wherein the formation of the thermal oxide film is carried out at least in an atmosphere of a gaseous mixture of hydrogen and oxygen or in an atmosphere of H₂O.

22. (previously submitted) A process according to claim 18, wherein the heat-treatment is carried out for relaxation of stress in the thermal oxide film.

23. (previously submitted) A process for producing a semiconductor device, which comprises the steps of:

oxidizing a main surface of a silicon substrate,
forming an oxidation-preventing film on portions of the oxidized silicon substrate,
removing a part of the oxidation-preventing film that is located in an element-separating area,
forming an element-separating oxide film on the silicon substrate in the element-separating area after removing the part of the oxidation-preventing film,
forming a thermal oxide film on the silicon substrate by oxidizing the silicon substrate,
forming a gate electrode film on the thermal oxide film, and
after forming the gate electrode film, carrying out a heat-treatment at a temperature of 800°C or higher in an inert atmosphere.

24. (previously submitted) A process according to claim 23, wherein the heat-treatment is carried out in an atmosphere of an inert gas selected from nitrogen, hydrogen and argon, or a gaseous mixture of these gases, said gas or gaseous mixture being able to contain 5% or less of oxygen.

25. (previously submitted) A process according to claim 23, wherein the oxide film is kept in a bare state during the heat treatment for stress relaxation,

26. (previously submitted) A process according to claim 23, wherein the formation of the thermal oxide film is carried out at least in an atmosphere of a gaseous mixture of hydrogen and oxygen or in an atmosphere of H_2O .

27. (previously submitted) A process according to claim 23, wherein the heat-treatment is carried out for relaxation of stress in the gate electrode film.

28. (New) A process for producing a semiconductor device, which comprises the steps of:

- forming an oxidation-preventing film on an oxidized surface of a semiconductor substrate,
- removing a part of the oxidation-preventing film that is located in an element-separating area adjacent to an element-forming area,
- forming an element-separating oxide film in the element-separating area on the semiconductor substrate after removing the part of the oxidation-preventing film,
- carrying out a heat-treatment at a temperature of $800^\circ C$ or higher while

keeping the oxide film in the element-forming area on the surface of the semiconductor substrate in an inert atmosphere,

exposing the surface of the semiconductor substrate in the element-forming area, and

forming a gate oxide film over the heat-treated semiconductor substrate.

29. (New) A process for producing a semiconductor device, which comprises the steps of;

forming a thermal oxide film on a semiconductor substrate,

forming a nitride film on the thermal oxide film,

forming an element-separating area after removing a part of the nitride film,

removing the nitride film formed on the rest of the area after, removal of the previous step, followed by heat-treatment at 800°C or higher,

exposing the semiconductor substrate in the area from which the nitride film is removed,

forming a gate oxide film on the exposed semiconductor substrate,

carrying out a heat-treatment of the gate oxide film formed semiconductor substrate at a temperature of 800°C, and

forming a gate electrode on the gate oxide film.

30. (New) A process for producing a semiconductor device, which comprises the steps of:

forming a nitride film having an opening on a silicon substrate surface,

forming an element-separating area which separates semiconductor elements

with electrical insulation,
removing the nitride film,
carrying out a heat-treatment at a temperature of 800°C or higher,
forming an gate oxide film on the silicon substrate separated by the element-separation area, and
carrying out a heat-treatment at a temperature of 950°C or higher in a state wherein the gate oxide film is formed.

31. (New) A process for producing a semiconductor device, which comprises the steps of:

forming a nitride film having an opening on a silicon substrate surface,
forming a partially thick oxide film for separating semiconductor elements with electrical insulation,
removing the nitride film,
carrying out a heat-treatment at a temperature of 800°C or higher,
forming a gate oxide film for MOS transistor, and
immediately after the gate oxidation, carrying out a heat-treatment at a temperature of 800°C or higher of the silicon substrate on which the gate oxide film is formed, or after forming a gate electrode on the gate oxide film, carrying out a heat-treatment at a temperature of 800°C or higher.

32. (New) A process for producing a semiconductor device according to claim 28, wherein the semiconductor device is a memory device or a computing device.

33. (New) A process for producing a semiconductor device according to claim 32, wherein the memory device is a flash memory, a dynamic random access memory or a static random access memory.

34. (New) A semiconductor device produced by the process of claim 28.

35. (New) A process for producing a semiconductor device wherein a gate insulating film is an oxide film, which comprises the steps of:

 forming a thermal oxide film on a semiconductor substrate,
 forming a nitride film on the thermal oxide film,
 forming an element-separating area by removing a part of the nitride film, after removal of the nitride film retained in the area not removed in the previous step, carrying out a heat-treatment at a temperature of 800°C or higher,
 exposing the semiconductor substrate surface in the area from which the nitride film is removed,
 forming a gate oxide film on the exposed semiconductor substrate surface,
 forming a gate electrode on the gate oxide film, and
 heat-treating the semiconductor substrate on which the gate electrode is formed, at a temperature of 800°C or higher.

36. (New) A process for producing a semiconductor device, which comprises the steps of:

 forming a tunnel oxide film on a semiconductor substrate,
 forming a floating electrode on the tunnel oxide film,

forming an insulating film on the floating electrode,
forming a controlling electrode on the insulating film, and
subjecting the semiconductor substrate on which the controlling electrode is
formed to heat-treatment at a temperature of 800°C or higher.